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(54) Dummy plug for electrical socket

(57) A dummy plug moulded from electrically insulating plastics has a base plate (2a) and pins (3, 4, 5) projecting from the plate (2a); at least one of the pins (5) is resiliently compressible in a transverse direction for secure engagements with a socket contact. The pin is bifurcated to provide the resilience or may be formed with an elongate closed slot (fig 3, not shown).

The base plate (2a) is formed with a peripheral flange (2b) which projects obliquely rearwardly to provide a grip for removal of the dummy plug from the socket.

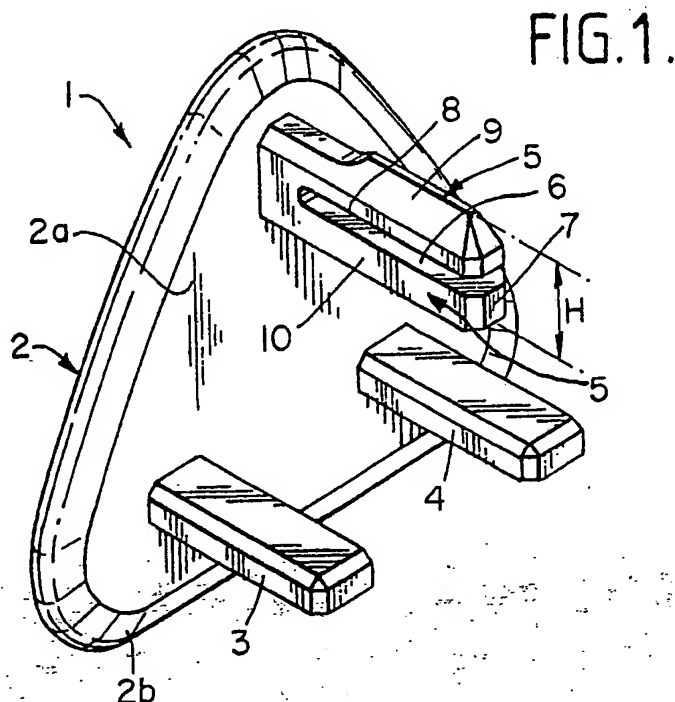




Fig. 1 is a perspective view of a mechanical assembly. It shows a vertical plate 11 with a horizontal rod 12 passing through it. The rod has a central section 13 with a diamond-shaped hole. A sleeve 14 is on the rod, and a cap 15 is at the end.

SAFETY PLUG

This invention relates to a safety plug for use with an electrical socket. Such devices are also known as dummy plugs or socket inserts.

5       Electrical sockets which provide for connection of an electrical appliance to an electrical power supply include at least two, and commonly three socket holes for receiving respective pins of an electrical plug, the third socket hole providing for  
10   earth connection. Many existing forms of electrical socket are of such construction that when there is no plug connected to it, the individual holes behind which the pin-engaging elements are located, are open and this presents a potential safety hazard for young  
15   children, whose inquisitiveness may lead them to insert electrically conductive items, such as knitting needles into the holes, with serious and possibly fatal consequences.

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20       To avoid this danger, it is known to provide a safety plug moulded from a suitable insulating plastics material, the plug having a body portion to be located against the outer face of the electrical socket, and pins of substantially the same size and

arrangement as the pins of the electrical plug. The safety plug is used to blank off the electrical socket by inserting the pins into the socket holes and pushing the body portion home until it engages the outer face of the socket. The pins are held in the socket holes by the pin-engaging elements mentioned earlier.

It will be appreciated that the degree of safety afforded by this known kind of safety plug relies upon the plug being held firmly in place so that it is difficult for a young child to remove it from the socket, while at the same time it must be reasonably easily removed by an adult. These requirements impose strict manufacturing tolerances on the cross-sectional dimensions of the pins; if such a dimension is slightly too small it will be too easy for the plug to be removed from the socket, while if it is too large, it will require an excessive force to remove it.

Even when these strict tolerances are observed, the minor dimensional variations which occur in socket outlets of different manufacturers may result in the safety plug fitting properly in some socket outlets but not others. Furthermore, over an extended period

of use the pin-engaging elements of sockets become worn, and their grip on the safety plug pins may weaken to the extent that the safety plug becomes too loose in the socket for it to remain effective.

5       The present invention aims to alleviate at least partly these problems.

According to the present invention there is provided a safety plug for an electrical socket which is adapted to receive and make electrical contact with  
10   at least two conductive pins of an electrical plug, and has respective pin-engaging elements for said pins, the safety plug having at least one elongate pin made of electrically insulating material, and formed so to be resiliently compressible in a direction  
15   transverse its axis thereby, in use, to secure the plug in the socket.

The resilient compressibility<sup>rr</sup> of the pin may be provided by the formation of a gap, which in said transverse direction separates first and second  
20   portions of the pin.

In a first embodiment, the pin is bifurcated, said gap extending to the outer end of the pin. In a second embodiment, the gap comprises a slot extending along an intermediate portion of the pin.

5 In both embodiments, at least one of the portions separated by the gap is formed on its edge or surface facing outwardly in said transverse direction with a projection for engagement by a said pin-engaging element to cause the portion or portions to flex.  
10 inwardly towards the pin axis and exert an outward retentive force on said pin-engaging element. The projection may comprise an elongate cam extending along the pin, so that at the position of the cam the pin has an outer dimension, measured in said  
15 transverse direction in the uncompressed state of the pin, which is greater than the same dimension of the corresponding pin of the corresponding electrical plug. Accordingly, the pin-engaging elements in the corresponding hole of the electrical socket will  
20 engage the cam so as to compress the pin by causing resilient inward deflection of the pin portion carrying the cam, thus causing the pin to be held firmly in the hole.

Preferred embodiments of the invention will now

be described by way of example with reference to the accompanying drawings in which:-

Figure 1 is a front perspective view of a safety plug according to a first embodiment of the present invention;

Figure 2 is a part side elevational and part sectional view of the safety plug shown in Fig. 1; and

Figure 3 is a side elevational view of a pin of a safety plug according to a second embodiment of the present invention.

With reference to Figures 1 and 2, a safety plug (1) which is integrally moulded as a one-piece element from an electrically insulating plastics material, comprises a suitably shaped base plate (2) and a plurality of elongate, parallel pins projecting from the front side thereof, the arrangement of these pins corresponding to the arrangement of holes of the electrical socket with which the plug is to be used; the arrangement of pins therefore corresponds with the arrangement of conducting pins in the power plug to be used with the electrical socket. In the illustrated

embodiment, the plug is to be used with a standard UK three-contact socket outlet, and comprises first, second and third pins (3, 4 and 5 respectively), for insertion into the live, neutral and earth holes, respectively of such a socket outlet.

The base plate (2) of the plug has a central portion (2a) which in the fully inserted position of the plug lies flat against an outer flat surface of the socket, and a peripheral flange (2b) extending obliquely rearwardly from the plane of the flat portion (2a). The provision of this flange (2b) facilitates removal of the plug from the socket by enabling the user to obtain a firm grip with his or her fingers between the front face (A) of the socket outlet (illustrated in broken lines in Fig.2), and the periphery of the plug base to exert an outward force (F) large enough to remove the plug from the socket.

At least one of the pins, in this case the earth pin (5), is bifurcated so that there is an elongate axially extending gap (6) projecting rearwardly from the forward free end (7) of the pin. At least one of the two limbs of the pin, separated by the gap (6), in this case the upper limb (8) is formed on its outer surface with a cam (9) which extends in the same



transverse direction as that in which the gap (6) divides the pin. The height of the cam is such that at the position of the cam, the overall outer dimension (H) of the pin measured in that same direction is greater than the same dimension of the earth pin of a corresponding electrical plug.

Accordingly, when the plug is inserted into the socket, the pin-engaging elements for the earth pin will engage the outer surface (S) of the cam (9), causing the upper limb (8) to flex downwardly towards the lower limb (10). Since the upper limb (8) flexes resiliently, it will, when flexed, exert on the pin-engaging elements an outer force in the direction of the arrow (B) which produces an increased frictional resistance to oppose the outward force (F) applied to the plug.

One or both of the pins (3) and (4) to be inserted into the power holes of the socket may, instead of or in addition to the earth hole pin (5), be bifurcated and provided with a cam.

In the second embodiment illustrated in Fig. 3, the earth hole pin (and/or one or both of the power hole pins) is formed along an intermediate portion of

its length with an elongate, axially extending slot (13) which divides that portion of the pin into two portions (14) spaced apart in a direction transverse the pin. One or each, in this case each, of the divided portions (14) is formed on its outer edge or surface which faces in that same transverse direction, with a cam (15). When the safety plug according to this second embodiment is inserted into a power socket, engagement of the cams (15) by the pin-engaging elements of the socket cause a resilient compression of the pin by flexing the divided portions (14) inwardly toward the pin axis, thus narrowing the slot (13).

The pin constructions described above in accordance with the invention permit the safety plug to be firmly held in an electrical socket, despite small dimensional differences between the pin-engaging elements of different electrical sockets, such differences being attributable, as discussed earlier, to variation in manufacturing tolerances of different manufacturers, and/or to different degrees of wear in different sockets. These dimensional differences merely cause varying degrees of compression of the pin in the transverse direction.

CLAIMS

1. A safety plug for an electrical socket which is adapted to receive and make electrical contact with at least two conductive pins of an electrical plug,  
5 and has respective pin-engaging elements for said pins, the safety plug having at least one elongate pin made of electrically insulating material, and formed so to be resiliently compressible in a direction transverse its axis thereby, in use, to secure the  
10 plug in the socket.
2. A safety plug according to claim 1 wherein said at least one pin is formed with an axially extending gap, which in said transverse direction separates first and second portions of the pin.
- 15 3. A safety plug according to claim 2 wherein said at least one pin is bifurcated, said gap extending to the outer level of the pin.
4. A safety plug according to claim 2 wherein said gap comprises a slot extending along an  
20 intermediate portion of the pin.
5. A safety plug according to any of claims 2 to 4 wherein at least one of said portions separated

by the gap is formed on its edge or surface facing outwardly in said transverse direction with a projection for engagement by a said pin-engaging  
5 element to cause the portion or portions to flex inwardly toward the pin axis, and exert an outward retentive force on said pin-engaging element.

6. A safety plug according to claim 5 wherein said projection comprises an elongate cam extending  
10 along the pin.

7. A safety plug according to claim 6 wherein at the position of said cam, the pin has an outer dimension, measured in said transverse direction in the uncompressed state of the pin, which is greater  
15 than the same dimension of the corresponding pin of the corresponding electrical plug.

8. A safety plug according to any preceding claim, the plug also including a substantially flat base member from which the, or each, pin projects  
20 forwardly, said base member being formed at at least part of its periphery with a flange which extends obliquely rearwardly.

9. A safety plug according to any preceding

claim wherein there are provided two pins for engaging  
in the power holes of the socket and a third pin for  
engaging in the earth hole of the socket, and wherein  
5 at least said third pin is so formed to be resiliently  
compressible.

10. A safety plug substantially as hereinbefore  
described with reference to figures 1 and 2 of the  
accompanying drawings.

10 11. A safety plug substantially as hereinbefore  
described with reference to figure 3 of the  
accompanying drawings.